

Cosine Rule:  $c^2 = a^2 + b^2 - 2ab \cos C$

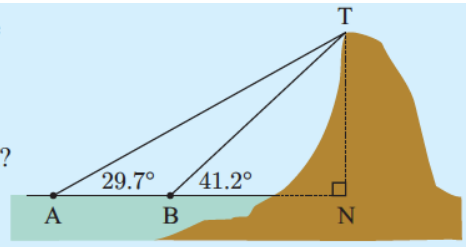
Sine Rule:  $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

$$\cos C = \frac{a^2 + b^2 - c^2}{2ab}$$

**Tools that we can use:**

Example:

The angles of elevation to the top of a mountain are measured from two beacons A and B at sea.  
 The measurements are shown on the diagram.  
 If the beacons are 1473 m apart, how high is the mountain?

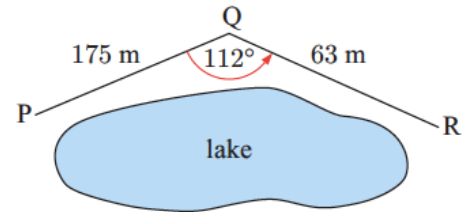


What are we looking for?

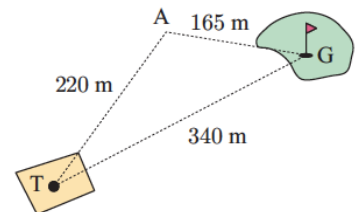
What do we know?

What tools might help?

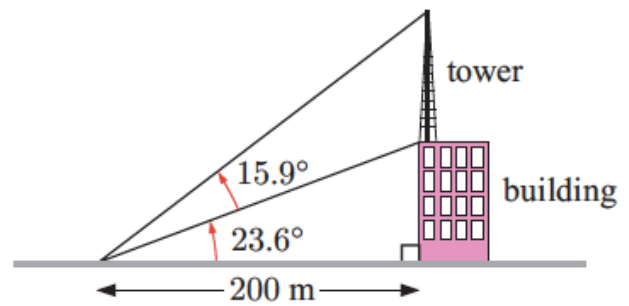
2) To get from P to R, a park ranger had to walk along a path from P to Q and then on to R as shown. What is the straight line distance from P to R?



3. A golfer played his tee shot a distance of 220 m to point A. He then played a 165 m 6-iron to the green. If the distance from the tee to the green is 340 m, determine the angle the golfer was off line with his tee shot.



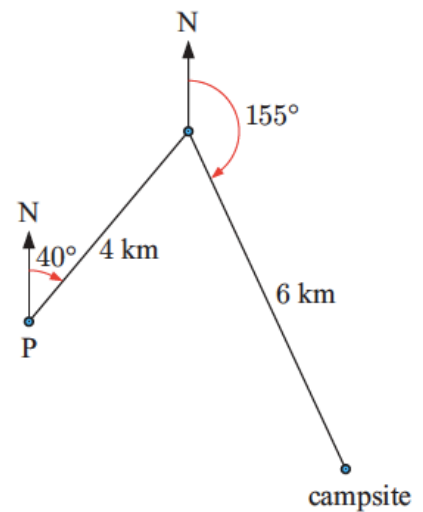
4. A communications tower is constructed on top of a building as shown. Find the height of the tower.



5. Hikers Ritva and Esko leave point P at the same time. Ritva walks 4 km on a bearing of  $040^\circ$ , then a further 6 km on a bearing of  $155^\circ$ .

Esko hikes directly from P to the camp site.

- a How far does Esko hike?
- b In which direction does Esko hike?
- c Ritva hikes at  $10 \text{ km h}^{-1}$  and Esko hikes at  $6 \text{ km h}^{-1}$ .
  - i Who will arrive at the camp site first?
  - ii How long will this person need to wait before the other person arrives?
- d On what bearing should the hikers walk from the camp site to return to P?



7. A tower 42 metres high stands on top of a hill. From a point some distance from the base of the hill, the angle of elevation to the top of the tower is  $13.2^\circ$  and the angle of elevation to the bottom of the tower is  $8.3^\circ$ . Find the height of the hill.